

Application No. : 09/380,247
Filed : August 31, 1999

REMARKS

Claims 6-9, 15-35, and 41-62 are pending in this application. The Office Action rejected Claims 6-9, 15-35, and 41-62 under 35 U.S.C. § 103 as being unpatentable over U.S. Patent No. 5,803,982 ("the Kosofsky patent") in view of U.S. Patent No. 4,517,849 ("the Nakahori patent"). By this amendment, Applicants have amended Claim 53 to correct a typographical informality. Reconsideration of the application, as amended, is respectfully requested.

OBJECTIONS TO CLAIM 53

The Examiner objected to Claim 53 for formalistic reasons. In response, Applicants have amended Claim 53 to correct the typographical informality.

REJECTION OF CLAIMS 6-9, 15-35, AND 41-62 UNDER 35 U.S.C. § 103

Claims 6-9, 15-35, and 41-62 stand rejected under 35 U.S.C. § 103 as being unpatentable over the Kosofsky patent in view of the Nakahori patent. The Applicants respectfully submit that the claims as previously pending are patentably distinguished over the Kosofsky and Nakahori patents for at least the following reasons.

In general, the Applicants have disclosed and claimed various embodiments of an ozone shower system that delivers ozone to a workpiece, such as a cassette of semiconductor wafers, in a manner designed to increase the reaction of the ozone with the workpiece without excessively damaging the same. According to various claims, the ozone shower system pulses a ozone-rich spray through a chamber lid having multiple spray nozzles, to a stationary or slowly rotating workpiece, thereby generating an ozone-rich fluid layer over the workpiece. Various claims include specific duty cycles, revolutions of the workpiece, and the like, to precisely control the thickness of the water layer, thereby controlling the effectiveness of the ozone absorption and reaction with the workpiece.

In response to the Applicants claims, the Applicants note that the Office Action alleges to render the foregoing technology obvious through the combination of a portable cleaning device for "washing or steam cleaning an automobile engine or auto parts" (Kosofsky, Col. 1, Lns. 31-35) with a system for cleaning the pipes of a water quality monitor for sewage treatment plants (Nakahori, Col. 1, Lns. 55-64). The Applicants submit that Kosofsky teaches away from the present claims in that Kosofsky is concerned with the

spillage of hazardous waste, such as oil and gasoline, when cleaning an automobile engine. Kosofsky is particularly unconcerned with increasing ozone reactions with a workpiece while avoiding damage of the same in order to decrease fabrication times. Thus, without even reaching the merits of individual claims, the Applicants respectfully assert that the Kosofsky and Nakahori patents, alone or in combination, utterly fail to teach or suggest elements of the pending claims.

In order for the Office Action to establish a *prima facie* case of obviousness for the pending claims, the cited prior art references must teach or suggest all the claim limitations. See M.P.E.P. Section 2143. The Applicants respectfully submit that the cited references, alone or in combination, fail to teach or suggest the elements of the pending claims for the following specific reasons.

The Office Action alleges that although the Kosofsky patent fails to teach a selector valve configured to pulse fluid through a sprayer, the Nakahori patent provides such teaching through the disclosure of a valve which alternates the sampling of ozone fluid of the ozone intermittent generator. See Page 3, Paragraph 1. The Office Action follows the foregoing allegation with the following paragraphs:

It would have been obvious to ... modify Kosofsky in view of Nakahori by using a valve to pulse the fluid through the sprayer because this will allow more flow control and more flexible in checking whether the spraying step is finished. Further Kosofsky is not particular whether his fluid is continuous ... therefore pulsing would produced an expected result.

Kosofsky is silent whether the workpiece is a semiconductor wafer ..., [therefore] it would have been obvious ... to use a semiconductor wafer.

Addressing the foregoing allegations and conclusions in order, the Applicants first submit that the Office Action mischaracterizes the teachings of Nakahori. For example, even though the Nakahori reference calls the ozone generator an intermittent generator, the reference discloses a valve for introducing ozone continuously during a cleaning mode. According to Nakahori, normally the water quality monitor for sewage treatment plants is sensing the purity of water from various water supplies, e.g., ports A and B. Then, when someone determines that the pipes of the water quality monitor need to be cleaned, the ozone generator 10 is activated to continuously flush ozone-enriched water through the

pipes of the system. See Col. 2, Ln. 39 through Col. 3, Ln. 8. Thus, Nakahori utterly fails to teach or suggest pulsing water in any way.

In addition, the Applicants submit that the allegation of Nakahori allowing Kosofsky to have more flow control and more flexibility in checking whether Kosofsky's spraying step is finished is not found or suggested in the references. For example, Kosofsky fails to teach or suggest any spraying step other than simple activation of a sprayer for cleaning and Nakahori has nothing to do with sprayers. Moreover, the allegation that pulsing would produce "an expected result" fails to suggest what the expected result would be. The expected result of Kosofsky is to clean automobile parts, and the Office Action fails to provide evidence that pulsing would produce a system capable of increasing the ozone reaction with automobile parts while avoiding damage thereto. Lastly, the Applicants assert that the allegation of the Office Action that the Kosofsky automobile parts cleaner may be used to clean one or more semiconductor wafers during a semiconductor process flow fails to recognize the technological distinctions between efficiently removing layers of photoresist on a semiconductor without damaging the same, and cleaning gasoline and oil from steel automobile parts.

In addition to failing to teach or suggest pulsing the fluid source, the Kosofsky and Nakahori patents fail to teach a duty cycle or pulse duration associated with a pulsing source. The Office Action alleges that the duty cycle or pulse duration are parameters that "are commonly determined by routine experiment." See Page 5, Paragraph 3. The Applicants note that a particular parameter must first be recognized as a result-effective variable before the determination of ranges may be characterized as routine experimentation. See M.P.E.P. Section 2144.05. As mentioned in the foregoing, the Kosofsky and Nakahori patents fail to recognize pulsing as a parameter and therefore, their disclosures necessarily fail to recognize pulse variations as a result-effective parameter for delivering ozone to a workpiece.

Thus, based on the foregoing, the Applicants assert that the Kosofsky patent and the Nakahori patents, alone or in combination, fail to teach or suggest pulsing fluid through a sprayer designed to increase ozone reaction with a semiconductor wafer. Moreover, the references fail to teach or suggestion duty cycles or pulse durations of the same. The Applicants also submit that Claims 6, 16-17, 21-26, 30-35, 41-47, 54-56, and 62 recite, among other things, subject matter related to pulsing fluid, pulse duty cycles, or pulse

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numbers/durations. Therefore, the Applicants assert that the foregoing references fail to teach or suggest Claims 6, 16-17, 21-26, 30-35, 41-47, 54-56, and 62, and respectfully request withdrawal of the rejections thereof.

Independent Claim 15 recites, among other things, a plurality of nozzles connected to a nozzle manifold. While the Office Action failed to specifically reference Claim 15, the Applicants assert that the Kosofsky and Nakahori patents, alone or in combination, fail to teach or suggest a plurality of nozzles or a nozzle manifold. In fact, as discussed in the foregoing, the Nakahori patent is about cleaning the insides of pipes used in water quality monitors for sewage treatment plants, and therefore, discloses no use of nozzles whatsoever. Therefore, the Applicants assert that the foregoing references fail to teach or suggest Claim 15 and respectfully request withdrawal of the rejection thereof.

Independent Claim 16, along with Claims 54 and 62, also include reference to rotating the workpiece, often at specifically claimed revolutions. The Office Action alleged that the rotation parameter is commonly determined by routine experiment and that "Kosofsky is not particular about the specific number or rpm and therefore any number would have produced an expected result." See Page 4, Paragraph 1. While the Applicants assert that the Office Action again fails to provide what expected result Kosofsky may be reaching, they also assert that Kosofsky teaches a freely rotating workpiece where the rotation is determined by the force of the sprayer. While free rotation may be sufficient for cleaning carburetors, the Applicants have disclosed and claimed specific revolution for transferring highly effective ozone to a semiconductor wafer. Thus, the Applicants assert that the finding of the Office Action again lacks support in the references necessary for alleging the obviousness of a rotation parameter.

Therefore, the Applicants assert that the Kosofsky and Nakahori patents, alone or in combination, fail to teach or suggest Claims 16, 54 and 62, and respectfully request withdrawal of the rejections thereof.

REQUEST FOR TELEPHONE INTERVIEW

Pursuant to M.P.E.P. § 713.01, in order to expedite prosecution of this application, Applicant's undersigned attorney of record hereby formally requests a telephone interview with the Examiner as soon as the Examiner has considered the effect of the arguments

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presented above. Applicant's attorney can be reached at (949) 721-2946 or at the number listed below.

CONCLUSION

In view of the forgoing, the present application is believed to be in condition for allowance, and such allowance is respectfully requested. If further issues remain to be resolved, the Examiner is cordially invited to contact the undersigned such that any remaining issues may be promptly resolved. Also, please charge any additional fees, including any fees for additional extension of time, or credit overpayment to Deposit Account No. 11-1410.

Respectfully submitted,

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Dated: August 21, 2001

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Version With Markings to Show Changes Made

Insertions appear as underlined text, for example, insertions, while deletions appear as strikethrough text, for example, ~~deletions~~.

In the Claims:

Please amend the following Claims.

53. (Amended) The apparatus of Claim 46 wherein the ozone-rich~~ozone-rich~~ environment is within a semiconductor processing chamber.

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